

FRIDAY Lesson Plan: Career Readiness Day

SUBJECT

Career Readiness

TEACHER

GRADE

DATE

02/26/2021

OVERVIEW

Introduce students to the career of engineering and field technicians at MDOT.

Have MDOT employees explain their duties and what is needed by new employees by MDOT.

Please send all collated student questions to [Michigan Department of Transportation - Home | Facebook](#) as a message

PHASES

TEACHER GUIDE

STUDENT GUIDE

PHASES	TEACHER GUIDE	STUDENT GUIDE
OBJECTIVES	<ul style="list-style-type: none"> Introduce students to a engineering/technical career at MDOT Describe what MDOT is looking for in new employees Show testimonials of MDOT employees 	<ul style="list-style-type: none"> Pay Attention to Videos Ask Questions about what engineers do and what to expect on the job Ask about experiences in the workplace and in the field
INFORMATION	<ul style="list-style-type: none"> Video 1: Kim McClain's Career at MDOT Video 2: Rod Jackson on being a MDOT Technician Video 3: Kimberly Webb, MDOT Region Engineer: What MDOT is looking for in new Employees. 	<ul style="list-style-type: none"> Listen for a position they might be interested in or might be fun for them. Ask questions about any positions they don't understand.
VERIFICATION	<ul style="list-style-type: none"> Pause videos for questions. Ask questions before videos about what students think a engineer/technicians does. 	<ul style="list-style-type: none"> Pay attention to what types of career they could have in MDOT
ACTIVITY	<ul style="list-style-type: none"> Have students describe what they think problems a engineer/technician solves. Discuss engineering solutions that students have come up with for everyday problems. 	<ul style="list-style-type: none"> Give lots of guesses from previous days info on what a engineer does. Tell examples of when you engineered a solution to common day problem. Ask questions for the MDOT Facebook page.

PHASES**TEACHER GUIDE****STUDENT GUIDE**

SUMMARY	<ul style="list-style-type: none"> Show students what MDOT employees do and the problems they solve. 	<ul style="list-style-type: none"> Ask lots of questions on what engineers/techs do and what they think they do.
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REQUIREMENTS**RESOURCES****NOTES**

Requirement 1
Watch Kim McClain's video to learn about early experiences at MDOT

Video 1: Kim McClain's Career at MDOT
<https://youtu.be/tREP37AQ6Uw>

Estimate Time: 5-10 min

Requirement 2
Watch Rod Jackson's video to learn about working as a MDOT technician

Video 2: Rod Jackson on being a MDOT Technician
<https://youtu.be/nRh5FHGDm6M>

Estimate Time: 10-15 min

Requirement 3
Watch Kim Webb's video to learn what MDOT is looking for in young engineers and technicians

Video 3: Kimberly Webb, MDOT Region Engineer: What MDOT is looking for in new Employees.
<https://youtu.be/PV9Pe3CCLOc>

Estimate Time: 5-10 min

Time Frame: 20-45 min

Michigan K-12 Standards, Science:

GRADE	1	2	3	4
MDE SUBJECT	Engineering Design	Structure and Properties of Matter Engineering Design	Forces and Interactions Engineering Design	Engineering Design
MDE CODES	K-2-ETS1-1 K-2-ETS1-2	2-PS1-1 K-2-ETS1-1 K-2-ETS1-2	3-PS2-1 3-5-ETS1-1 3-5-ETS1-2	3-5-ETS1-1 3-5-ETS1-2

GRADE	5	6-8	9-12
MDE SUBJECT	Structure and Properties of Matter Earth's Systems Engineering Design	Structure and Properties of Matter Energy Human Impacts Engineering Design	Structure and Properties of Matter Engineering Design
MDE CODES	5-PS1-4 5-ESS3-1 3-5-ETS1-1 3-5-ETS1-2	MS-PS1-3 MS-PS3-2 MS-ESS3-2 MS-ETS1-1	HS-PS2-6 HS-ETS1-2 HS-ETS1-3 HS-ETS1-4

Explanation of How Civil Engineering applies to the Above Curriculum Codes:

Structure and Properties of Matter: Concentrate on the hydrothermal nature of concrete curing and the chemical reaction of water + cement + gravel. This reaction creates silicone-based crystals within the cement, gives off heat from the hydrothermal reaction, and requires consuming water to keep the reaction constant. A lot of MDOT projects use concrete and keeping the reaction constant through water fogging and temperature control is a high priority during construction.

Earth's Systems: Dams inherently effect the surrounding ecosystem and waterways for miles. To prevent yearly flooding and increase traffic access MDOT builds culverts, dams, and channels. Channeling waterways help give access to traffic and building development but may raise flooding risk if a structural failure occurs.

Energy: Water has inherent potential energy when being released from a high point. Equating water to electricity using the same mathematical equations is how MDOT bases the size of its waterway structures.

Human Impact: As more vehicle mobility is needed more waterway structures are needed. These structures are designed to minimally impact the surrounding ecosystem and waterway flow but structure failure causes sudden wide range impacts. Natural disasters will use the force of nature to revert waterways back to what they previously were, resisting or overtaking the structures in its path.

Roadways will also affect wildlife ecosystems, especially highways that may interrupt natural habitats. MDOT does many environmental studies and applies for DEQ permits to ensure minimal impacts to the surrounding ecosystem and habitats.

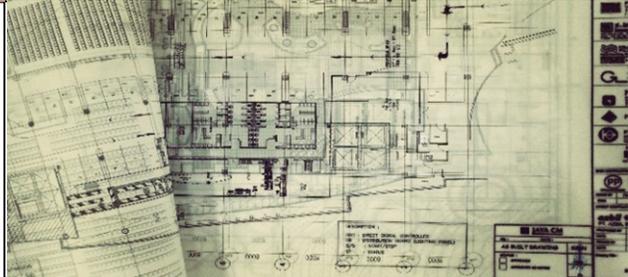
Engineering Design: MDOT uses numerous programs and engineering/tech teams to bring a project from design plans to a constructed structure. The most math and engineering intensive projects are usually for small renovations, emergency repairs, or long-standing travel issues. Simple questions such as “Can we had a extra traffic like on this cable without needing a stronger strain pole?” will lead into numerous calculations using physics and matched with construction specifications to a construction company bidding the job and ordering materials.

The most challenging issue is not the physics of the problem but what other structures or utilities are affected by the change. If you get larger aluminum or steel pole for more signals it will need a larger and deeper foundation that could impact utilities next to it. From here more calculations must be done to see if the utilities that may carry water/sewer pipes can be moved.



Survey Technician

Design Technician



Construction Technician

Engineer Technician



Permit Technician



Transportation Operation Technician

